

# Arterial pulse pressure increases according to diabetes duration, independently of age in patients with type 1 diabetes

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## BACKGROUND AND AIMS

Arterial pulse pressure (PP) reflects arterial stiffness and is considered as an independent cardiovascular risk factor. However, studies regarding PP in type 1 diabetic patients are scarce. The aim of the study was to investigate the influence of the duration of type 1 diabetes on PP, as well as to correlate PP with the quality of blood glucose control, the presence of microalbuminuria ( $\mu$ A) and/or the use of drugs blocking the renin-angiotensin system.

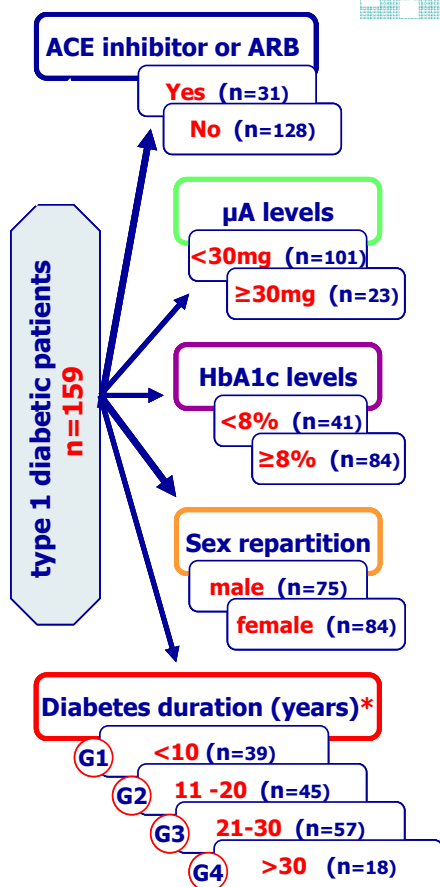
## METHODS

- 159 diabetic patients (20-60 years) were evaluated with a **continuous noninvasive arterial blood pressure monitoring (Finapres®)**. Recordings were performed in standing position (1 min), in squatting position (1 min), and again in standing position (1 min). Presented data correspond to **average PP** (systolic minus diastolic arterial pressure) values calculated during the overall recording in the 3 positions.
- Blood glucose control was assessed by concomitant **HbA1c levels**
- **Microalbuminuria ( $\mu$ A)** was measured as a marker of early diabetic nephropathy.

## POPULATION



## RESULTS



\* In order to differentiate the effects of duration of diabetes from the effect of increasing age, healthy subjects were used as controls and matched for age, sex and body mass index (n = 30 in each subgroup).

No significant differences were observed in diabetic patients receiving ( $56 \pm 14$  mm Hg) or not receiving ( $54 \pm 15$  mm Hg) an ACE inhibitor or an ARB.

Diabetic patients with  $\mu$ A ( $57 \pm 17$  mm Hg) and without  $\mu$ A ( $54 \pm 14$  mm Hg) have almost similar PP values (NS).

PP was similar in patients with HbA1c  $< 8\%$  ( $54 \pm 14$  mm Hg) or  $\geq 8\%$  ( $55 \pm 16$  mm Hg).

PP was higher in men than in women, in diabetic ( $58 \pm 15$  vs  $50 \pm 14$  mm Hg;  $p < 0.001$ ) and non-diabetic ( $55 \pm 14$  vs  $47 \pm 12$  mm Hg;  $p < 0.001$ ) subjects

- PP increased progressively throughout the 4 subgroups according to diabetes duration ( $47 \pm 16$  vs  $51 \pm 13$  vs  $59 \pm 14$  vs  $62 \pm 12$  mm Hg, respectively;  $p < 0.001$ ) : see subgroup repartition on the left (\*).
- There was a marked difference between groups 1-2 and groups 3-4 ( $49 \pm 14$  vs  $59 \pm 14$  mm Hg;  $p < 0.00002$ ) in diabetic patients, but not in non-diabetic subjects ( $51 \pm 12$  vs  $50 \pm 15$  mm Hg; NS), despite matching for age (mean of 35 years for groups 1-2 vs 46 years for groups 3-4).
- Percentage of subjects with PP  $> 60$  mm Hg (considered as a risk factor) was similar in diabetic and non-diabetic individuals in groups 1-2 (27 vs 25 %, NS); however, in groups 3-4, the prevalence of subjects with PP  $> 60$  mm Hg was significantly higher in diabetic patients than in controls (44 vs 27 %,  $p < 0.05$ ).
- The difference in PP between the four groups of diabetic patients, already present in standing position, was amplified in squatting position.

## CONCLUSIONS

Type 1 diabetes was associated with a progressive increase in PP according to the duration of the disease, in an age range where no significant influence of age was observed in a non-diabetic population. PP was not significantly influenced by concomitant HbA1c levels, a reflect of recent blood glucose control. The presence of microalbuminuria or the blockade of the renin-angiotensin system do not influence PP levels in the studied population.